mitted in this wood over this period. It is hoped that disappointed collectors will appreciate the need for such an action until more is known about both species, and until a conservation programme is planned ensuring large populations of both butterflies in the Reserves they inhabit.

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The Earwigs (Dermaptera) of the Galapagos Islands

By A. Brindle

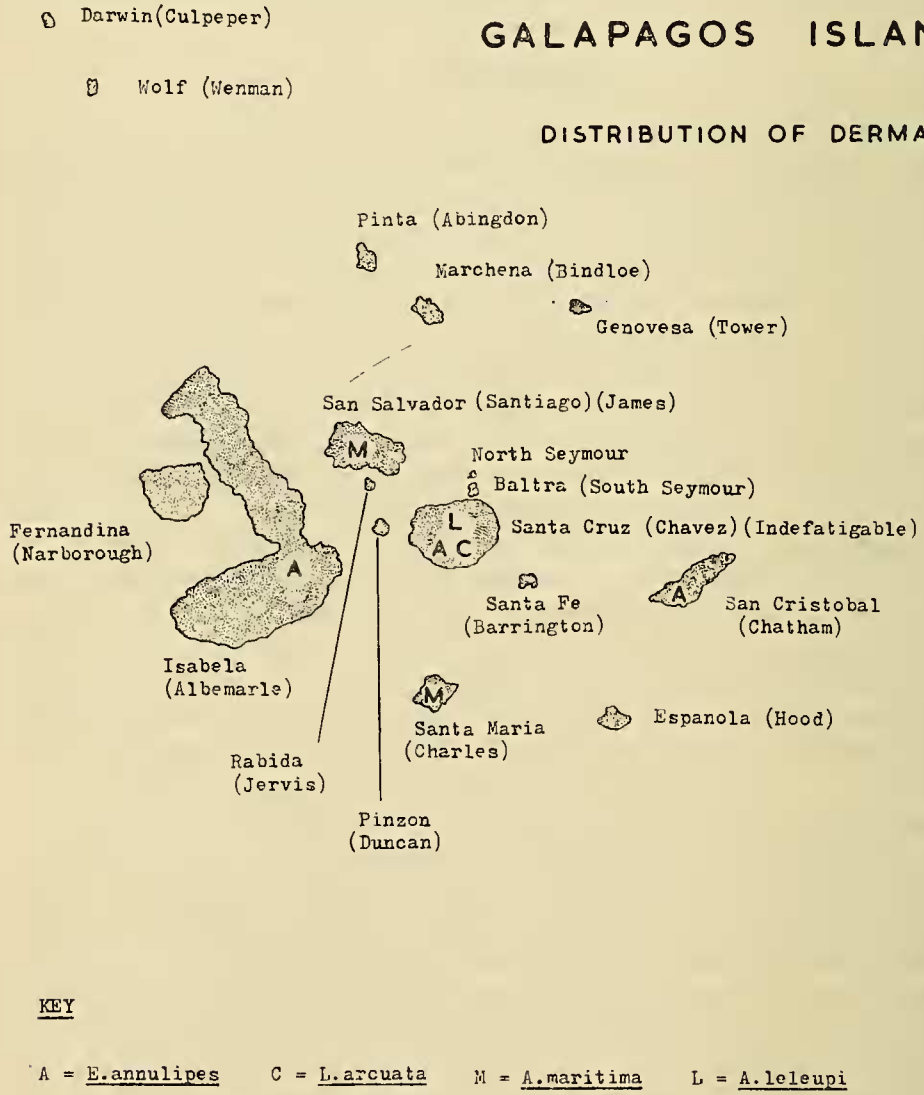
The order Dermaptera is relatively small, and the species are mainly tropical in distribution, being most abundant in the humid tropical forests of the world. Comparatively few species appear to be able to tolerate very dry or cold climates, and the majority of the species have a relatively restricted distribution. They are continental insects in general, and islands, particularly isolated oceanic islands, tend to have a very poor fauna of earwigs. There are, however, a few species of earwigs which have a comparatively wide tolerance of environmental conditions, and some of these have become cosmopolitan in distribution. These cosmopolitan species have sometimes such a wide distribution that it is difficult to trace their original centre, and they appear to owe their present wide distribution mainly to accidental importation into various countries by commerce. The habit of earwigs in hiding by day in crevices easily leads to such accidental introductions if control measures at ports are not strictly enforced. There are numerous records of living specimens of earwigs from tropical countries being found in ports in temperate countries, usually being intercepted on arrival. If control measures are not taken, these introductions can lead to the establishment of the particular species if the environment is suitable.

Countries in the North Temperate Zone are usually unsuitable for such introductions and establishment, owing to climatic conditions, but tropical or subtropical countries are usually favourable.

Such introductions may account for some of these cosmopolitan species occurring on oceanic islands; apart from the suitability of such islands as habitats, the chances of such species being introduced is correlated with the degree of isolation of the island, the more contacts with continental areas there are, and the more chances of introduction exist. The isolated Juan Fernandez and Easter Island, for example, each have only one known species of earwig: this is *Euborellia annulipes* (Lucas), a cosmopolitan species, which is the most widely distributed species of earwig, and which is evidently a most successful coloniser, originally being described from one specimen introduced into the Jardin des Plantes in Paris.

St Helena, in the Atlantic, although isolated, has a history of contact with continental areas, and three cosmopolitan species of earwigs occur on the island, one of which is *Eurobellia annulipes*.

It sometimes happens that an oceanic island has one or more endemic species of earwig, but this seems to be a rather rare occurrence, and any influx of cosmopolitan species may result in the extermination of such endemic species. Sometimes it is found that the more isolated islands are, and the less chance there is of endemic species being found. The Canary Islands, which lie from 80 to 200 miles from the African coast, have eight endemic species and four cosmopolitan species, whilst the Azores, which lie about 800 miles from the African coast, and about the same from the coast of Portugal, have no endemic species but five cosmopolitan species. No endemic species are known from Juan Fernandez or from Easter Island, but there is one on St Helena, and also one on Ascension Island in the Atlantic.



The Galapagos Islands form a group of volcanic islands about 500 miles west of Ecuador, to which the islands belong politically, having been annexed in 1832. Volcanic activity is not entirely quiescent, as the recent eruption has demonstrated. The islands are isolated in that they lie off the usual trade routes, but since the latter part of the eighteenth century the islands have been subjected to numerous visits by various ships, largely to obtain fresh food supplies; domestic animals have been

released during these visits, so that there has been considerable interference with the fauna. Although the majority of the islands have been declared nature reserves by the Ecuadorean authorities, there has been some difficulty in ensuring that these reserves were respected, and it was the realisation of the potential loss of the unique Galapagos fauna which led to the establishment of the Charles Darwin Research Station on Santa Cruz.

Previous to the establishment of the Research Station, only one species of earwig had been recorded from the islands: this was *Euborellia annulipes*, which is recorded from Albemarle and Chatham islands by Hebard (1920). Another three species are now known to occur on the islands, two of which are included in the present paper as new records for the islands. A further record of *Euborellia annulipes* from another island in the Galapagos group is also given. These new records are from specimens belonging to the California Academy of Sciences, which have recently been examined, and the author is indebted to Dr Paul H. Arnaud for the opportunity to examine these insects.

The increased scientific activity in the Galapagos islands will result in a better knowledge of the fauna, so that it may be difficult to judge whether new records indicate new adventive species, or whether such records are simply the result of more intensive study and consequent recognition of well established species. Although there have been numerous scientific expeditions to the islands previous to the formation of the Research Station, many appear to have been of short duration, but that organised by the Californian Academy of Sciences in 1905-1906 was much more thorough. It may be significant that this expedition did not obtain any earwigs; the Orthoptera obtained were studied by Hebard (1920) but his records of *E. annulipes* were apparently from earlier records, the source of which has not been located.

The recent Belgian Zoological expedition to Ecuador and the Galapagos islands, in 1964-1965, however. brought to notice the single endemic species of earwig which is known from the islands. This is *Anophthalmolabis leleupi*, described in Brindle (1968), which is a small yellowish blind earwig which is partly subterranean in habit, living in rock crevices, on the island of Santa Cruz. Its nearest know relative is *Anisolabis caeca* Borelli. the only other blind earwing known, and which is recorded from two specimens collected by Dr Silvestri whilst digging for termites at Sunchales, in the province of Santa Fe, Argentine, previous to 1902. The association of the earwigs with the termites is thought to be coincidental, and *A. caeca* is likely to be at least partly subterranean in habit as *A. leleupi*.

The specimens from the California Academy of Sciences consist of the following:—

Euborellia annulipes (Lucas): 3♂, and 5♀, from Table Mountain, 440 metres, Santa Cruz, 16.iv.1964 (D. Q. Cavagnaro).

Anisolabis maritima (Bonelli): 1♀, James Island, and 1 immature ♂, from Charles Island. These apterous earwigs are determined on the structure of the male genitalia, so that these specimens are referred to this species provisionally.

Labia arcuata Scudder: 3♂, 1♀, 7 large and 7 small nymphs; from near the Darwin Station, Academy Bay, Santa Cruz, 28.i.1964 R. O., Schuster).

E. annulipes is found throughout the World in tropical and subtropical countries; it appears to occur on many isolated oceanic islands if the species has always been correctly recognised. *A. maritima* is also cosmopolitan, but is less widely distributed than *annulipes*, and is typically maritime, being found mostly along sandy coasts. *L. arcuata* is a species of South and Central America, having been recorded from Brazil, Peru, Surinam, Panama, Guatemala, Mexico, and also Trinidad and Honduras.

The first two species can be regarded as originally adventive, but *E. annulipes* at least is likely to have become established. *L. arcuata* is probably a casual; its occurrence near the Research Station indicates a possible recent introduction from America.

The Dermaptera of the Galapagos islands, therefore, are typical of oceanic islands, as far as present records are concerned. There are few species; the single endemic species is closely related to a species on the nearest mainland; and two cosmopolitan species occur. The occurrence of *Labia arcuata* may not be significant in the future development of the fauna since this species may only be a casual, but further studies on the islands are likely to be very interesting and may well bring to notice further species.

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Comments on "Collecting in Spain, 1969" by Dr. R. G. Ainley

By Lieut. Col. W. B. L. Manley, F.R.E.S.

I have read Dr. R. G. Ainley's account of his collecting in Spain (1969, *Ent. Rec. J. Var.*, **81**: 273-275) with great interest.

In order that the record is kept correctly, I believe that the following entries should be carefully checked:—

Euchloe tagis Hübner. Four localities are given for this species from which it has not previously been recorded although *E. ausonia* Hübner is generally distributed in these areas. The dates given are extremely late for this species, which usually flies in April.

Colias hyale Linné. This is said to have been found in all localities visited but I have been able to trace only very few authentic records of this species from the Iberian Peninsula although *C. australis* Verity is found throughout most of Spain.

I will not discuss the finer points of nomenclature, as the author writes, "Any number can play", except to mention that the abbreviation "Schiff." to whom *M. phoebe* is attributed and "D & S" to whom *P. pandora* is attributed are the same authors, i.e., Denis and Schiffermüller.—

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